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HIGH CERVICAL LESIONS IN THE GUISE OF COMBINED SYSTEM DISEASE

E. D. FRIEDMAN

The diagnosis of a level lesion in the cord seldom offers serious difficulties, although we may not always be certain of the nature of the pathological process which produces the level signs. We have had occasion, however, to observe two cases of high cervical cord lesion, in both of which the early signs pointed to combined system disease. It was only later in the course of their development that the evidences suggestive of a level lesion became manifest.

The first patient was a fourteen-year-old schoolboy who complained first of increasing weakness of the lower limbs. Soon afterward the upper extremities also showed loss of power. The patient noted shortness of breath and cardiac palpitation. There was incontinence of urine at times. Priapism occurred at intervals. He was admitted to Mt. Sinai Hospital in July, 1920. He presented labored breathing, tilting of the head with the chin directed to the left, nystagmus in the horizontal plane, motor weakness, more marked on the left, disturbances in joint mobility and vibratory sense in all four extremities, astereognosis in both hands, ataxia with tabetic athetosis in the hands, general exaggeration of the deep reflexes, diminution of lower abdominals, bilateral Babinski, spastic-ataxic gait, a positive Romberg sign and cerebellar phenomena, more marked on the left.

The general medical status showed no abnormalities. On one occasion sugar was found in the urine. Spinal fluid revealed no abnormal findings. Blood Wassermann proved negative.

The case was considered a cross between the Friedreich and Marie forms of ataxia.

He was discharged from Mt. Sinai Hospital on August 20, 1920. About four months later, he was admitted to Montefiore Hospital with the same complaints, in an aggravated form, however. The pyramidal tract signs had become more pronounced.

He now exhibited cross-legged progression. In addition to the disturbances in posterior-column sensation and the cerebellar manifestations, he now presented an area of hyperaesthesia in the distribution of the upper cervical segments and tenderness over the upper cervical spine. Below this hyperaesthetic zone, there were mild disturbances in pain and temperature sense. He rapidly developed the signs of a transverse lesion of the upper cervical cord and succumbed.

The autopsy findings were as follows: In the region of the foramen magnum, the upper cervical cord was found compressed by a mass springing from the odontoid process. This was composed of dense fibrous tissue in which was imbedded a bony nodule (osteo-fibroma).

The second patient was a fifty-five year old watchman who was admitted to Bellevue Hospital in July, 1924. For seven months prior to his admission, he complained of sharp pains in both shoulders radiating down the left arm and even into the left lower extremity. Four months later, he noted a similar pain in the right arm. He soon found that he was unable to execute finer movements with either hand. Walking became increasingly difficult and there was some hesitancy in voiding urine. He also noticed a sharp pain in the left side of the neck radiating upward.

Physical examination revealed moderate emphysema and mild athero-sclerosis. The neurological examination showed weakness of the upper extremities, more pronounced in the left, and paresis of both lower limbs. There seemed to be no disturbances in superficial sensation, but joint mobility and vibratory sense were impaired from the shoulders down. There was astereognosis in both hands with tabetic athetosis and ataxia. Gait was spastic-ataxic. There was a positive Romberg sign. Abdominals were diminished. Deep reflexes were exaggerated. A right Hoffman and bilateral Babinski sign were present.

The chief symptoms were those referable to the posterior and lateral columns.

Spinal fluid showed no abnormalities except for a tendency to a paretic gold curve. Gastric analysis revealed hypochlorhydria. There were no evidences of pernicious anemia.

It was thought that we might be dealing with a capsulo-thalamic lesion on a degenerative basis. It was difficult, however, to

reconcile the diagnosis of a cerebral lesion with the absence of any changes referable to the cranial nerves. He was discharged for further observation.

Patient was readmitted in January, 1925, with the same complaints but increasing weakness. Definite atrophy and fibrillary twitching were now present in the muscles of the left shoulder girdle. The sensory disturbances were the same as those previously noted, but there was now demonstrated an area over the left shoulder, in the form of an epaulette, in which pain, tactile and temperature sense were impaired. Patient held his head rather stiffly.

Lumbar puncture now revealed manometric block and mild xanthochromia.

The sensory changes soon extended upward to C2. Faradic responses, in the left deltoid and biceps muscles were diminished. Fibrillation was observed in both trapezius and sterno mastoid muscles, but more especially on the left.

Fluroscopic examination of the diaphragm showed limited excursions on the left side. No Bence-Jones bodies were found in the urine.

It was now felt that we were dealing with a lesion near the foramen magnum with antero-posterior compression of the cord at C2. It was advised that upper cervical laminectomy with partial removal of the foramen magnum be performed. This was done on May 1, 1925.

There was no evidence of bony disease. The dura appeared whitish and dense. The arachnoid seemed thicker than normal and was definitely adherent to the cord and to the dura. Overlying the first and second cervical segments, there was a dense whitish mass that seemed to mushroom out of the cord. It was quite thick and its caudal extremity spread out finger-like over the cord. Attempts to find a line of demarcation between this mass and the cord were unsuccessful. The cord was adherent to the dura on either side for a distance of two or three segments. The upper border of this mass presented a very sharp line of demarcation. This adhesive process seemed to obstruct completely the circulation of the cerebro-spinal fluid. Except for the adhesions and the mass mentioned, the cord appeared normal. The pathological condition found explained the spinal block and

the scar tissue probably accounted for the pain in this area. It was considered that the process was inflammatory rather than neoplastic (possibly luetic in origin).

Microscopic study was not made.

The patient survived the operation only 24 hours. No autopsy was performed.

HEMILAMINECTOMY

ALFRED S. TAYLOR

In the December meeting of 1909 the original paper of "Unilateral Laminectomy" was presented. It is now called "Hemilaminectomy" because of the custom among most writers.

Most neurological surgeons think the method has no advantages. The usual operation, "bilateral laminectomy," has been perfected and made easy, but there are conditions in which hemilaminectomy has decided advantages.

Before discussing them it should be stated that special instruments, designed for the purpose, are essential to the satisfactory performance of this operation. With the use of these instruments it is possible to remove the laminae of one side so as to give an exposure fully as wide and usable as that obtained in the usual bilateral laminectomy.

It will be noticed that the exposure indicated in the pictures is at an angle very favorable for the exploration of the cord with very little manipulation necessary. The following things have been repeatedly done without damage to the cord:

Exploration of the spine at all levels.
(With lumbar lordosis and thick muscles the procedure is difficult and unsatisfactory.)
Dorsal ramisection on one or both sides.
Unilateral chordotomy can be accomplished with perfect ease, but bilateral chordotomy cannot be done.
Exposure of spinal cord tumors with their removal.

These have frequently been done; tumors have varied from 3 to 5 cm. in length and 1 to 2 cm. in diameter.

They have been ventral; they have been lateral; they have been dorso-lateral. They have been removed so that there has been no evidence of damage to the cord from necessary manipulation.

Intramedullary tumors have been explored, decompressed by splitting the cord and leaving the dura unsutured.

One chondroma on the ventral aspect in the cervical region was removed with rapid improvement on the part of the patient.

Exposure of adhesive arachnoiditis simulating tumors.

Exposure of "meningo-myelitis" simulating tumors.

Therefore, hemilaminectomy can be used with safety to the patient and most of the things usually done through bilateral laminectomy can be accomplished through a hemilaminectomy.

The question is, whether under certain circumstances hemilaminectomy possesses such decided advantages over the usual procedure that it ought to be the method of choice.

Remember that in hemilaminectomy the laminae of one side and the spinous processes are left intact together with their muscular and ligamentous attachments, a great stabilizing item. This is particularly true in the cervical spine. When complete laminectomy is done the ligamentum nuchae is more or less destroyed and the only supports left to the neck are the intervertebral disc and the ligaments between the bodies of the vertebrae and articular processes.

Three cases are cited in which bilateral laminectomy in the cervical region was followed by dislocation of greater or less degree; in one case leading ultimately to death; in the third case probably causing death, and in the second case causing no trouble.

In the lumbar and sacral regions if bilateral laminectomy is done, if there is a tendency to spondylo-listhesis, then the patient has very little support against a recurrence of this disability and there is no bone so situated as to permit fusion of the spine or bone implant which would give sufficient rigidity to prevent this accident. Illustrations are given of these conditions.

Ventral and ventro-lateral tumors can be approached and disposed of through the lateral exposure natural to hemilaminectomy with far less manipulation of the cord than is feasible in the usual laminectomy.

Finally, it should be stressed that if hemilaminectomy is used for exploration and a condition is found which cannot be properly handled, it is the simplest thing in the world to convert the exposure into a bilateral laminectomy, involving as much of the field as is necessary.

Various cases were cited to illustrate and prove the assertions made in the body of the paper.

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THE SIGNIFICANCE OF THE CHANGES IN THE CHEMISTRY OF THE BLOOD IN PERTUSSIS

JOSEPH C. REGAN

ALEXANDER TOLSTOOUHOV

This subject first began to interest the authors because of the unusual effect observed in a case of severe pertussis and gastric ulcer following the administration of alkalies. After further corroborative evidence of the curative value of the remedy, it was decided to look into the chemistry of the blood in this infection.

No information was available in the literature, the examinations of the blood heretofore published being concerned with the total and differential blood-cell counts. Therefore an investigation of this neglected field of blood chemistry was undertaken.

A total of 682 determinations were carried out, including hydrogen ion, inorganic phosphorus, calcium, carbon dioxide, urea, uric acid, creatinine, and sugar.

Two very significant alterations were found:—(1) A diminution of the total inorganic phosphorus and (2) a change in the hydrogen-ion concentration. These changes were found so frequent in the acute stage that they might almost be called characteristic.

These changes occur early in the disease, appearing even in the catarrhal stage and they are well developed, especially the alteration in phosphorus, during the first few weeks of the paroxysms. There appears to exist a certain parallelism in the changes in P H and phosphorus which signifies a close interrelation.